PATENT ABSTRACTS OF JAPAN

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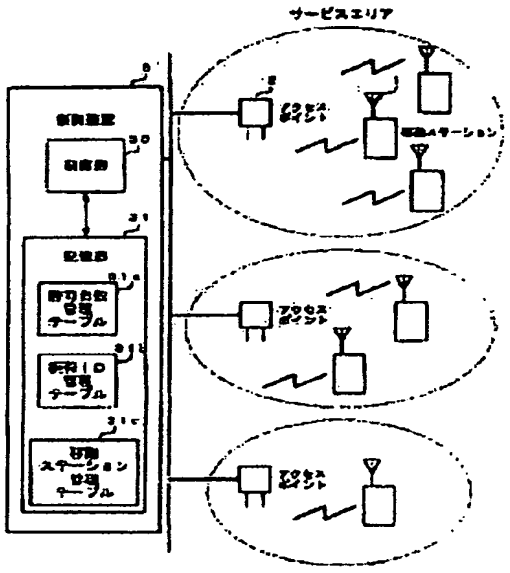
(54) RADIO LAN SYSTEM

(57)Abstract:
PROBLEM TO BE SOLVED: To suppress deterioration of transmission/reception throughput by regulating the connection to a roaming station when a connection request exceeding a previously decided number is made to an access point from the roaming station in a service area managed by an arbitrary access point among plural access points.
SOLUTION: When the power of the roaming station 1 is turned on and it roams from out of the service area, the connection request containing a self-identifier is transmitted to the access point 2. The access point 2 adds an access point number of the connection request and transmits it to a controller 3. The controller 3 stores the number of connection possible stations at every access point 2 in a storage device 31 and executes recognition processing of the connection request. When connection is possible, a connection request reception is returned to the access point 2, and connection request denial when connection is denied. The access point 2 returns it to the roaming station 1.



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CLAIMS

[Claim(s)]
[Claim 1]In a wireless LAN system which has two or more access points, from a move station in a service area which arbitrary access points manage, A wireless LAN system characterized by restricting connection of said move station when it succeeds in a connection request exceeding the number beforehand defined to said access point.
[Claim 2]When it succeeds in a connection request from a move station in a service area which arbitrary access points manage in a wireless LAN system which has two or more access points, A wireless LAN system restricting connection of said move station by an identifier of a move station beforehand appointed to said access point.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention]This invention relates to the wireless LAN system which is applied to a wireless LAN system, especially can restrict connection of a move station for every access point.
[0002]
[Description of the Prior Art]The conventional wireless LAN system is explained using drawing 8. Drawing 8 is a block diagram showing the outline composition of the conventional wireless LAN system. The move station 1 which performs data communications mutually via a radio transmission line and cable LAN as the conventional wireless LAN system is shown in drawing 8, Radio with the move station 1 in a service area was performed, and also it comprised access point 2' which functions the bridge which connects cable LAN between non-railroad sections.
[0003]In the conventional wireless LAN system, one radio medium is assigned to access point 2', and said radio medium is shared by many move stations 1 in a service area. That is, the frequency band assigned to access point 2' as a radio medium is used, dividing into the message channel for data communications, the request channel for message channel reservation, and the response channel for the response to a request.
[0004]And the accessing method between access point 2' and the move station 1 has a common radio-medium access control system of the reserving system which reserves the channel used in advance of data communications. When requiring data communications in the direction of access point 2' from the move station 1, specifically, the request frame (connection request) for message channel reservation is transmitted from the move station 1 to access point 2' using a request channel.
[0005]And access point 2' which received the request frame from the move station 1 which

probably exist in the service area performs scheduling, and returns the move station 1 by making propriety of message channel use reservation into a response frame using a response channel.

[0006]And the move station 1 which received this response frame uses a message channel for the scheduled time, and transmits transmission data to access point 2' at it.

[0007]

[Problem to be solved by the invention]However, in the conventional wireless LAN system. The number of times per unit time to which the message channel of a radio medium is assigned decreased to one set of the move station 1, and there was a problem that a transceiver throughput will fall, so that there were many move stations 1 linked to one access point 2'.

[0008]Since it was altogether connectable, the move station 1 which requires connection in a service area had the problem that the security management resulting from using radio as a transmission medium was not enough.

[0009]This invention by having been accomplished in view of the above-mentioned actual condition, and controlling connection of the move station in a service area beforehand according to the terms of the license set up for every access point, Connection of a move station is restricted under a specific condition, and it aims at providing the wireless LAN system which can control the fall of a transceiver throughput.

[0010]

[Means for solving problem]The invention according to claim 1 for solving the problem of the above-mentioned conventional example, In the wireless LAN system which has two or more access points in a wireless LAN system, From the move station in the service area which arbitrary access points manage, When it succeeds in a connection request exceeding the number beforehand defined to said access point, it is characterized by restricting connection of said move station, and connection of the move station in a specific access point can be restricted with the number of connection pedestals.

[0011]The invention according to claim 2 for solving the problem of the above-mentioned conventional example, In the wireless LAN system which has two or more access points in a wireless LAN system, When it succeeds in a connection request from the move station in the service area which arbitrary access points manage, It is characterized by restricting connection of said move station by the identifier of the move station beforehand appointed to said access point, and connection of the move station in a specific access point can be restricted by the identifier of a move station.

[0012]

[Mode for carrying out the invention]The embodiment is described about invention concerning a claim, referring to Drawings. The wireless LAN system concerning this invention forms the control device which performs connection admission control of the move station in the access

point connected via cable LAN, Memorize the identifier of the number and a move station, etc. in a control device as connection permission conditions for the move station in each access point, and the connection request from a move station is received, Since connection is permitted and a move station is connected only when it judges whether connection permission conditions are suited and suits with a control device, under a specific condition, connection of a move station can be restricted for every access point.

[0013]First, the composition of the wireless LAN system concerning this invention is explained using drawing 1. Drawing 1 is a configuration block figure of the wireless LAN system concerning this invention. The same mark is attached and explained about the portion which takes the same composition as drawing 8.

[0014]The wireless LAN system (this system) of this invention comprises the move station 1 and the access point 2 as the same portion as the conventional wireless LAN system, and also the control device 3 is formed as a characterizing portion of this invention.

[0015]Next, each part of this system is explained concretely. The move station 1 is completely the same as usual, and is equipment which communicates mutually by connecting with wireless LAN. And the time of the power supply being turned on in the service area which the move station 1 manages in a certain access point 2, Communication will be henceforth possible, if the connection request containing a self identifier (ID) is transmitted to the access point 2 and connection-request reception is received from the access point 2, when it has moved from the outside of this service area.

[0016]The move station 1 memorizes an identifier (ID) to the inside, and adds the identifier to the connection request to the access point 2. As an identifier of the move station 1, when the interface protocol of cable LAN sets to Ethernet and IEEE802.3, for example, it is most effective to assign the MAC Address which is an address of a meaning on a network as an identifier of a move station.

[0017]While the access point 2 is equipment which performs radio transmission and reception with the move station 1, it has a function equivalent to the bridge which connects basic sir BIRUERIA (Basic Service Area:BSA) and backbone LAN (cable LAN) of radio. That is, the header for cable LAN is added to the data received from between non-railroad sections, and it sends out to cable LAN, or the header for between non-railroad sections is added to the data conversely received from cable LAN, and it sends out between non-railroad sections.

[0018]And the access point 2 has memorized the access point number inside as a self identifier, into the header for cable LAN, incorporates an access point number and transmits.

[0019]It is connected with the access point 2 via cable LAN, and the control device 3 controls the connection permission of the move station 1 in the access point 2.

[0020]As the composition inside the control device 3 is shown in drawing 1, it comprises the control section 30 and the storage parts store 31, and the number management table 31a of

permission, refusal ID management table 31b, and the move station management table 31c are memorized by the storage parts store 31.

[0021]The number management table 31a of permission is a table which manages the number of a connection permission of the move station 1, and the junction state of the move station 1 every access point 2.

[0022]2 of this invention]. Number management TE of permission of this invention comprises:

RU 31a should be shown in drawing 2,

The set a and AKUSESUPO.

TO number b.

Good number c.

Drawing 2 is a figure showing the example of a format and the example of storing of the number management table 31a of permission which are memorized by the control device 3 of this invention.

[0023]The offset a is a sequential number for several minutes of the access point 2 connected to this wireless LAN system by cable LAN. While the access point number b is an identifier of the access point 2, it shows a BSA number.

[0024]The number c of permission memorizes the number of a connection permission of the move station 1 in the access point 2 set up beforehand as connection permission conditions. When the number c of permission is set as 0, connection of the move station 1 in this access point 2 is refused unconditionally. A several d connection pedestal memorizes the number of connection pedestals of the actual condition in the access point 2.

[0025]Refusal ID management table 31b is a table which manages the identifier (ID) of the move station 1 which refuses connection every access point 2.

[0026]6 of this invention]. Refusal ID management TE of this invention comprises:

RU 31b should be shown in drawing 3,

The set e and AKUSESUPO.

TO number f.

Drawing 3 is a figure showing the example of a format and the example of storing of refusal ID management table 31b which are memorized by the control device 3 of this invention.

[0027]The offset e is a sequential number for several refusal ID minutes set up to the access point 2 connected to this wireless LAN system by cable LAN. While the access point number f is an identifier of the access point 2, it shows a BSA number. The refusal IDg is an identifier (ID) of a move station which refuses connection in the access point 2 as connection permission conditions.

[0028]The move station management table 31c comprises the offset h, the access point number i and move station identifier j, and connection-timer k, as shown in drawing 4. Drawing 4 is a figure showing the example of a format and the example of storing of the move station

management table 31c which are memorized by the control device 3 of this invention.
[0029]The offset h is a sequential number for several minutes of the move station 1 connected to the access point 2 connected to this wireless LAN system by cable LAN. While the access point number i is an identifier of the access point 2, it shows a BSA number.
[0030]Move station identifier j is an identifier (ID) of the move station 1 connected in the access point 2. Connection-timer k is a timer which manages the connectable state of the move station 1 under connection with the access point 2, and, specifically, has managed the time to registration erasion.
[0031]And when the control device 3 is new and receives the connection request from the move station 1 via the access point 2 actually, The access point number i and move station identifier j are memorized, the specific time (the maximum long time to registration erasion) beforehand provided in connection-timer k is set up, and the decrement of the time of connection-timer k is carried out one by one henceforth.
[0032]And if the time of connection-timer k is set to 0, it will be judged that it was no longer a connectable state, and the record will be deleted from the move station management table 31c. If before deletion has a connection request from the same access point number i and move station identifier j again, the maximum long time to registration erasion will be set and reset by connection-timer k then.
[0033]The control section 30 controls the connection permission of the move station 1 in the access point 2, and specifically, Connection-admission-control processing which controls the connection permission to the connection request from the move station 1 received via the access point 2, and move station management processing which manages the move station 1 connected to the access point 2 under management are performed.
[0034]First, it explains flowing into connection-admission-control processing of the control section 30 using drawing 5. Drawing 5 is a flow chart figure showing the flow of the connection-admission-control processing in the control section 30 of the control device 3 of this invention.
[0035]The connection-admission-control processing in the control section 30 of the control device 3 of this invention, Will be started if a connection request is received from the access point 2, and a connection request judges in the right (100), and a right case (Yes), It is judged whether an access point number with a connection request and the combination of the move station identifier are registered into the move station management table 31c (101).
[0036]And when not registered, (No) refers to the number management table 31a of permission, It judges whether the number of permission corresponding to the number of the access point 2 which transmitted the connection request is 0 (102), and when it is not 0 (Yes), it is judged whether the number of connection pedestals corresponding to the number of the access point 2 is smaller than the number of permission (104).
[0037] And when the number of connection pedestals is smaller than the number of

permission, (Yes), With reference to refusal ID management table 31b, it is judged whether ID of the move station 1 is refusal ID corresponding to the number of the access point 2 (106), If it is not refusal ID (Yes), connection-request reception is transmitted to the access point 2 (110), and it will add to the number of connection pedestals in the number management table 31a of permission one, and will update (120), registration to the move station management table 31c will be performed (122), and connection-admission-control processing will be ended.

[0038]Here, the registration to the move station management table 31c is processing which sets the maximum long time to the registration erasion which stores in the move station management table 31c the access point number i and move station identifier j which transmitted the connection request, and is defined further beforehand as connection-timer k.

[0039]On the other hand, in the processing 101, when registering with the move station management table 31c (Yes), Connection-request reception is transmitted to the access point 2 (130), the maximum long time to registration erasion is set up and reset to connection-timer k of the move station identifier of the move station management table 31c concerned (132), and connection-admission-control processing is ended.

[0040]When a connection request is not right in the processing 100 and the number of permission is 0 in (No) and the processing 102, on the other hand, (No), When the number of connection pedestals is not smaller than the number of permission in the processing 104 and it is refusal ID in (No) and the processing 106, (No) transmits connection-request refusal to the access point 2 (112), and ends connection-admission-control processing.

[0041]Judged, in processing of drawing 5, when it was not registered whether the access point number which transmitted the connection request, and the combination of the move station identifier are registered into the move station management table 31c, it progressed to the processing 102 as new, but. When arbitrary move station identifiers are registered in combination with another access point, The record is deleted for the registration concerned from the move station management table 31c, and one, after subtracting and updating, if it is made to progress to the processing 102, the number of connection pedestals can be more strictly managed for the number of connection pedestals in the access point concerned in the number management table 31a of permission.

[0042]Although the above-mentioned explanation described that ID of the move station 1 which refuses connection was registered into refusal ID management table 31b, and a connection request from registered ID was refused, Conversely, ID of the move station 1 which permits connection is registered, and you may make it only registered ID permit registration.

[0043]Next, it explains flowing into move station management processing of the control section 30 using drawing 6. Drawing 6 is a flow chart figure showing a flow of move station management processing in the control section 30 of the control device 3 of this invention. Drawing 6 shows processing to one move station registered into the move station

management table 31c, and will repeat the same processing to all the registered move stations actually.

[0044]The move station management processing in the control section 30 of the control device 3 of this invention, It is started for every update-units time of connection-timer k set up beforehand, and only update-units time subtracts connection-timer k of the move station management table 31c (202), It judges whether the value of connection-timer k was set to 0 (204), and when it is not 0, (No) ends move station management processing.

[0045]On the other hand, when the value of connection-timer k is set to 0, registration is erased (210), the several d connection pedestal of the number management table 31a of permission about the access point of the move station concerned is subtracted from the move station management table 31c one time (212), and move station management processing is ended.

[0046]Next, operation of the wireless LAN system of this invention is explained using drawing 1 and drawing 7. Drawing 7 is an explanatory view showing the connect control sequence of the move station 1 in the wireless LAN system of this invention. In the wireless LAN system of this invention, when the power supply of the move station 1 is turned on under BSA which a certain access point 2 manages, when the move station 1 has moved from the outside of this BSA, the connection request containing a self identifier (ID) is transmitted to the access point 2.

[0047]The access point 2 which received the connection request from the move station 1 adds the access point number of self to a connection request, and transmits to the control device 3.

[0048]And the control device 3 which received the connection request from the access point 2, as connection-admission-control processing, confirming processing of a connection request is performed and connection is possible -- if it is (O.K.), connection-request reception will be replied to the access point 2 by return, and if it is a connection refusal (NG), connection-request refusal will be replied to the access point 2 by return.

[0049]Here, as confirming processing of a connection request, the contents of the connection request are right, and when the combination of the move station 1 and the access point 2 which carried out the connection request is already registered into the move station management table 31c, it judges with connection being only possible. When not registering with the move station management table 31c, the propriety of connection is judged according to the number of permission and refusal ID which are the terms of the license set up beforehand, and if connection is possible, the number of connection pedestals of the number management table 31a of permission will be added one time.

[0050]In the control device 3, in order to manage the number of permission which is one of the terms of the license, the junction state of the move station 1 connected to the access point 2 is managed. That is, if a connection request comes from the access point 2, the maximum long time to registration erasion will be set as the move station management table 31c as a

connection timer with an access point number and a move station identifier.
[0051]And if the value of a connection timer is subtracted for every update-units time and it is set to 0, registration will be erased and the number of connection pedestals of the number management table 31a of permission will also be reduced.
[0052]And the access point 2 which received connection-request reception or connection-request refusal replies the connection-request reception or connection-request refusal to the move station 1.
[0053]If according to the wireless LAN system of this invention the number of a connection permission for every access point 2 is beforehand memorized to the storage parts store 31 in the control device 3 and the control device 3 receives the connection request from the move station 1 by access point 2 course, Since connection-request reception is returned to the move station 1 when the terms of the license whether the number of connection pedestals is within the limits of the number of a connection permission are judged about the access point 2 concerned and it conforms to terms of the license, The number of the move stations 1 which connects every access point 2 can be restricted, the fall of the transceiver throughput between the move station 1 and the access point 2 can be controlled, and there is an effect which makes possible traffic control in the whole wireless LAN system.
[0054]According to the wireless LAN system of this invention, refusal ID or permission ID for every access point 2 is beforehand memorized to the storage parts store 31 in the control device 3, If the control device 3 receives the connection request from the move station 1 by access point 2 course, About the access point 2 concerned. [whether the move station 1 concerned is refusal ID in the access point 2, and] Or since connection-request reception is returned to the move station 1 when the terms of the license whether to be permission ID are judged and it conforms to terms of the license, It is effective in being realizable of proper connection of the move station in a specific area by eliminating connection of the unsuitable move station 1, or connecting the proper move station 1 to the move station 1 connected every access point 2.
[0055]There is an effect which can cancel penetration of the unjust terminals in the case of connecting radio to an electric telecommunication line via the insecurity to the security resulting from considering it as the transmission medium, for example, a network, etc., incorrect fee collection, erroneous connection, etc. by managing connection with this system for every move station.
[0056]
[Effect of the Invention]Since it is considered as the wireless LAN system which restricts connection of a move station when it succeeds in a connection request from a move station exceeding the number beforehand defined to arbitrary access points according to the invention according to claim 1, Connection of the move station in a specific access point can be

restricted with the number of connection pedestals, and there is an effect which can control the fall of the transceiver throughput between non-railroad sections.

[0057]When it succeeds in a connection request from a move station in an access point according to the invention according to claim 2, Since it is considered as the wireless LAN system which restricts connection of a move station by the identifier of the move station beforehand appointed to the access point, Connection of the move station in a specific access point can be restricted by the identifier of a move station, and it is effective in being realizable of proper connection of a move station in a specific area.

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TECHNICAL FIELD

[Field of the Invention]This invention relates to the wireless LAN system which is applied to a wireless LAN system, especially can restrict connection of a move station for every access point.

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PRIOR ART

[Description of the Prior Art]The conventional wireless LAN system is explained using drawing 8. Drawing 8 is a block diagram showing the outline composition of the conventional wireless LAN system. The move station 1 which performs data communications mutually via a radio transmission line and cable LAN as the conventional wireless LAN system is shown in drawing 8, Radio with the move station 1 in a service area was performed, and also it comprised access point 2' which functions the bridge which connects cable LAN between non-railroad sections.

[0003]In the conventional wireless LAN system, one radio medium is assigned to access point 2', and said radio medium is shared by many move stations 1 in a service area. That is, the frequency band assigned to access point 2' as a radio medium is used, dividing into the message channel for data communications, the request channel for message channel reservation, and the response channel for the response to a request.

[0004]And the accessing method between access point 2' and the move station 1 has a common radio-medium access control system of the reserving system which reserves the channel used in advance of data communications. When requiring data communications in the direction of access point 2' from the move station 1, specifically, the request frame (connection request) for message channel reservation is transmitted from the move station 1 to access point 2' using a request channel.

[0005]And access point 2' which received the request frame from the move station 1 which probably exist in the service area performs scheduling, and returns the move station 1 by making propriety of message channel use reservation into a response frame using a response channel.

[0006]And the move station 1 which received this response frame uses a message channel for the scheduled time, and transmits transmission data to access point 2' at it.

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EFFECT OF THE INVENTION

[Effect of the Invention]Since it is considered as the wireless LAN system which restricts connection of a move station when it succeeds in a connection request from a move station exceeding the number beforehand defined to arbitrary access points according to the invention according to claim 1, Connection of the move station in a specific access point can be restricted with the number of connection pedestals, and there is an effect which can control the fall of the transceiver throughput between non-railroad sections.
[0057]When it succeeds in a connection request from a move station in an access point according to the invention according to claim 2, Since it is considered as the wireless LAN system which restricts connection of a move station by the identifier of the move station beforehand appointed to the access point, Connection of the move station in a specific access point can be restricted by the identifier of a move station, and it is effective in being realizable of proper connection of a move station in a specific area.

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TECHNICAL PROBLEM

[Problem to be solved by the invention]However, in the conventional wireless LAN system. The number of times per unit time to which the message channel of a radio medium is assigned decreased to one set of the move station 1, and there was a problem that a transceiver throughput will fall, so that there were many move stations 1 linked to one access point 2'.
[0008]Since it was altogether connectable, the move station 1 which requires connection in a service area had the problem that the security management resulting from using radio as a transmission medium was not enough.
[0009]This invention by having been accomplished in view of the above-mentioned actual condition, and controlling connection of the move station in a service area beforehand according to the terms of the license set up for every access point, Connection of a move station is restricted under a specific condition, and it aims at providing the wireless LAN system which can control the fall of a transceiver throughput.

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MEANS

[Means for solving problem]The invention according to claim 1 for solving the problem of the above-mentioned conventional example, In the wireless LAN system which has two or more access points in a wireless LAN system, From the move station in the service area which arbitrary access points manage, When it succeeds in a connection request exceeding the number beforehand defined to said access point, it is characterized by restricting connection of said move station, and connection of the move station in a specific access point can be restricted with the number of connection pedestals.
[0011]The invention according to claim 2 for solving the problem of the above-mentioned conventional example, In the wireless LAN system which has two or more access points in a wireless LAN system, When it succeeds in a connection request from the move station in the service area which arbitrary access points manage, It is characterized by restricting connection of said move station by the identifier of the move station beforehand appointed to said access point, and connection of the move station in a specific access point can be restricted by the identifier of a move station.
[0012]
[Mode for carrying out the invention]The embodiment is described about invention concerning a claim, referring to Drawings. The wireless LAN system concerning this invention forms the control device which performs connection admission control of the move station in the access point connected via cable LAN, Memorize the identifier of the number and a move station, etc. in a control device as connection permission conditions for the move station in each access point, and the connection request from a move station is received, Since connection is permitted and a move station is connected only when it judges whether connection permission conditions are suited and suits with a control device, under a specific condition, connection of a move station can be restricted for every access point.
[0013]First, the composition of the wireless LAN system concerning this invention is explained

using drawing 1. Drawing 1 is a configuration block figure of the wireless LAN system concerning this invention. The same mark is attached and explained about the portion which takes the same composition as drawing 8.

[0014]The wireless LAN system (this system) of this invention comprises the move station 1 and the access point 2 as the same portion as the conventional wireless LAN system, and also the control device 3 is formed as a characterizing portion of this invention.

[0015]Next, each part of this system is explained concretely. The move station 1 is completely the same as usual, and is equipment which communicates mutually by connecting with wireless LAN. And the time of the power supply being turned on in the service area which the move station 1 manages in a certain access point 2, Communication will be henceforth possible, if the connection request containing a self identifier (ID) is transmitted to the access point 2 and connection-request reception is received from the access point 2, when it has moved from the outside of this service area.

[0016]The move station 1 memorizes an identifier (ID) to the inside, and adds the identifier to the connection request to the access point 2. As an identifier of the move station 1, when the interface protocol of cable LAN sets to Ethernet and IEEE802.3, for example, it is most effective to assign the MAC Address which is an address of a meaning on a network as an identifier of a move station.

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[0018]And the access point 2 has memorized the access point number inside as a self identifier, into the header for cable LAN, incorporates an access point number and transmits.

[0019]It is connected with the access point 2 via cable LAN, and the control device 3 controls the connection permission of the move station 1 in the access point 2.

[0020]As the composition inside the control device 3 is shown in drawing 1, it comprises the control section 30 and the storage parts store 31, and the number management table 31a of permission, refusal ID management table 31b, and the move station management table 31c are memorized by the storage parts store 31.

[0021]The number management table 31a of permission is a table which manages the number of a connection permission of the move station 1, and the junction state of the move station 1 every access point 2.

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[0023]The offset a is a sequential number for several minutes of the access point 2 connected to this wireless LAN system by cable LAN. While the access point number b is an identifier of the access point 2, it shows a BSA number.
[0024]The number c of permission memorizes the number of a connection permission of the move station 1 in the access point 2 set up beforehand as connection permission conditions. When the number c of permission is set as 0, connection of the move station 1 in this access point 2 is refused unconditionally. A several d connection pedestal memorizes the number of connection pedestals of the actual condition in the access point 2.
[0025]Refusal ID management table 31b is a table which manages the identifier (ID) of the move station 1 which refuses connection every access point 2.
[0026]6 of this invention]. Refusal ID management TE of this invention comprises:
RU 31b should be shown in drawing 3,
The set e and AKUSESUPO.
TO number f.
Drawing 3 is a figure showing the example of a format and the example of storing of refusal ID management table 31b which are memorized by the control device 3 of this invention.
[0027]The offset e is a sequential number for several refusal ID minutes set up to the access point 2 connected to this wireless LAN system by cable LAN. While the access point number f is an identifier of the access point 2, it shows a BSA number. The refusal IDg is an identifier (ID) of a move station which refuses connection in the access point 2 as connection permission conditions.
[0028]The move station management table 31c comprises the offset h, the access point number i and move station identifier j, and connection-timer k, as shown in drawing 4. Drawing 4 is a figure showing the example of a format and the example of storing of the move station management table 31c which are memorized by the control device 3 of this invention.
[0029]The offset h is a sequential number for several minutes of the move station 1 connected to the access point 2 connected to this wireless LAN system by cable LAN. While the access point number i is an identifier of the access point 2, it shows a BSA number.
[0030]Move station identifier j is an identifier (ID) of the move station 1 connected in the access point 2. Connection-timer k is a timer which manages the connectable state of the move station 1 under connection with the access point 2, and, specifically, has managed the time to

registration erasion.
[0031]And when the control device 3 is new and receives the connection request from the move station 1 via the access point 2 actually, The access point number i and move station identifier j are memorized, the specific time (the maximum long time to registration erasion) beforehand provided in connection-timer k is set up, and the decrement of the time of connection-timer k is carried out one by one henceforth.
[0032]And if the time of connection-timer k is set to 0, it will be judged that it was no longer a connectable state, and the record will be deleted from the move station management table 31c. If before deletion has a connection request from the same access point number i and move station identifier j again, the maximum long time to registration erasion will be set and reset by connection-timer k then.
[0033]The control section 30 controls the connection permission of the move station 1 in the access point 2, and specifically, Connection-admission-control processing which controls the connection permission to the connection request from the move station 1 received via the access point 2, and move station management processing which manages the move station 1 connected to the access point 2 under management are performed.
[0034]First, it explains flowing into connection-admission-control processing of the control section 30 using drawing 5. Drawing 5 is a flow chart figure showing the flow of the connection-admission-control processing in the control section 30 of the control device 3 of this invention.
[0035]The connection-admission-control processing in the control section 30 of the control device 3 of this invention, Will be started if a connection request is received from the access point 2, and a connection request judges in the right (100), and a right case (Yes), It is judged whether an access point number with a connection request and the combination of the move station identifier are registered into the move station management table 31c (101).
[0036]And when not registered, (No) refers to the number management table 31a of permission, It judges whether the number of permission corresponding to the number of the access point 2 which transmitted the connection request is 0 (102), and when it is not 0 (Yes), it is judged whether the number of connection pedestals corresponding to the number of the access point 2 is smaller than the number of permission (104).
[0037] And when the number of connection pedestals is smaller than the number of permission, (Yes), With reference to refusal ID management table 31b, it is judged whether ID of the move station 1 is refusal ID corresponding to the number of the access point 2 (106), If it is not refusal ID (Yes), connection-request reception is transmitted to the access point 2 (110), and it will add to the number of connection pedestals in the number management table 31a of permission one, and will update (120), registration to the move station management table 31c will be performed (122), and connection-admission-control processing will be ended.
[0038]Here, the registration to the move station management table 31c is processing which

sets the maximum long time to the registration erasion which stores in the move station management table 31c the access point number i and move station identifier j which transmitted the connection request, and is defined further beforehand as connection-timer k.
[0039]On the other hand, in the processing 101, when registering with the move station management table 31c (Yes), Connection-request reception is transmitted to the access point 2 (130), the maximum long time to registration erasion is set up and reset to connection-timer k of the move station identifier of the move station management table 31c concerned (132), and connection-admission-control processing is ended.
[0040]When a connection request is not right in the processing 100 and the number of permission is 0 in (No) and the processing 102, on the other hand, (No), When the number of connection pedestals is not smaller than the number of permission in the processing 104 and it is refusal ID in (No) and the processing 106, (No) transmits connection-request refusal to the access point 2 (112), and ends connection-admission-control processing.
[0041]Judged, in processing of drawing 5, when it was not registered whether the access point number which transmitted the connection request, and the combination of the move station identifier are registered into the move station management table 31c, it progressed to the processing 102 as new, but. When arbitrary move station identifiers are registered in combination with another access point, The record is deleted for the registration concerned from the move station management table 31c, and one, after subtracting and updating, if it is made to progress to the processing 102, the number of connection pedestals can be more strictly managed for the number of connection pedestals in the access point concerned in the number management table 31a of permission.
[0042]Although the above-mentioned explanation described that ID of the move station 1 which refuses connection was registered into refusal ID management table 31b, and the connection request from registered ID was refused, Conversely, ID of the move station 1 which permits connection is registered, and you may make it only registered ID permit registration.
[0043]Next, it explains flowing into the move station management processing of the control section 30 using drawing 6. Drawing 6 is a flow chart figure showing the flow of the move station management processing in the control section 30 of the control device 3 of this invention. Drawing 6 shows the processing to one move station registered into the move station management table 31c, and will repeat the same processing to all the registered move stations actually.
[0044]The move station management processing in the control section 30 of the control device 3 of this invention, It is started for every update-units time of connection-timer k set up beforehand, and only update-units time subtracts connection-timer k of the move station management table 31c (202), It judges whether the value of connection-timer k was set to 0 (204), and when it is not 0, (No) ends move station management processing.

[0045]On the other hand, when the value of connection-timer k is set to 0, registration is erased (210), the several d connection pedestal of the number management table 31a of permission about the access point of the move station concerned is subtracted from the move station management table 31c one time (212), and move station management processing is ended.

[0046]Next, operation of the wireless LAN system of this invention is explained using drawing 1 and drawing 7. Drawing 7 is an explanatory view showing the connect control sequence of the move station 1 in the wireless LAN system of this invention. In the wireless LAN system of this invention, when the power supply of the move station 1 is turned on under BSA which a certain access point 2 manages, when the move station 1 has moved from the outside of this BSA, the connection request containing a self identifier (ID) is transmitted to the access point 2.

[0047]The access point 2 which received the connection request from the move station 1 adds the access point number of self to a connection request, and transmits to the control device 3.

[0048]And the control device 3 which received the connection request from the access point 2, as connection-admission-control processing, confirming processing of a connection request is performed and connection is possible -- if it is (O.K.), connection-request reception will be replied to the access point 2 by return, and if it is a connection refusal (NG), connection-request refusal will be replied to the access point 2 by return.

[0049]Here, as confirming processing of a connection request, the contents of the connection request are right, and when the combination of the move station 1 and the access point 2 which carried out the connection request is already registered into the move station management table 31c, it judges with connection being only possible. When not registering with the move station management table 31c, the propriety of connection is judged according to the number of permission and refusal ID which are the terms of the license set up beforehand, and if connection is possible, the number of connection pedestals of the number management table 31a of permission will be added one time.

[0050]In the control device 3, in order to manage the number of permission which is one of the terms of the license, the junction state of the move station 1 connected to the access point 2 is managed. That is, if a connection request comes from the access point 2, the maximum long time to registration erasion will be set as the move station management table 31c as a connection timer with an access point number and a move station identifier.

[0051]And if the value of a connection timer is subtracted for every update-units time and it is set to 0, registration will be erased and the number of connection pedestals of the number management table 31a of permission will also be reduced.

[0052]And the access point 2 which received connection-request reception or connection-request refusal replies the connection-request reception or connection-request refusal to the move station 1.

[0053]If according to the wireless LAN system of this invention the number of a connection permission for every access point 2 is beforehand memorized to the storage parts store 31 in the control device 3 and the control device 3 receives the connection request from the move station 1 by access point 2 course, Since connection-request reception is returned to the move station 1 when the terms of the license whether the number of connection pedestals is within the limits of the number of a connection permission are judged about the access point 2 concerned and it conforms to terms of the license, The number of the move stations 1 which connects every access point 2 can be restricted, the fall of the transceiver throughput between the move station 1 and the access point 2 can be controlled, and there is an effect which makes possible traffic control in the whole wireless LAN system.

[0054]According to the wireless LAN system of this invention, refusal ID or permission ID for every access point 2 is beforehand memorized to the storage parts store 31 in the control device 3, If the control device 3 receives the connection request from the move station 1 by access point 2 course, About the access point 2 concerned. [whether the move station 1 concerned is refusal ID in the access point 2, and] Or since connection-request reception is returned to the move station 1 when the terms of the license whether to be permission ID are judged and it conforms to terms of the license, It is effective in being realizable of proper connection of the move station in a specific area by eliminating connection of the unsuitable move station 1, or connecting the proper move station 1 to the move station 1 connected every access point 2.

[0055]There is an effect which can cancel penetration of the unjust terminals in the case of connecting radio to an electric telecommunication line via the insecurity to the security resulting from considering it as the transmission medium, for example, a network, etc., incorrect fee collection, erroneous connection, etc. by managing connection with this system for every move station.

[Translation done.]

* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1]It is a configuration block figure of the wireless LAN system concerning this invention.
[Drawing 2]It is an explanatory view showing the example of a format and the example of storing of the number management table of permission which are memorized by the control device of this invention.
[Drawing 3]It is an explanatory view showing the example of a format and the example of storing of a refusal ID management table which are memorized by the control device of this invention.
[Drawing 4]It is an explanatory view showing the example of a format and the example of storing of a move station management table which are memorized by the control device of this invention.
[Drawing 5]It is a flow chart figure showing the flow of the connection-admission-control processing in the control section of the control device of this invention.
[Drawing 6]It is a flow chart figure showing the flow of the move station management processing in the control section of the control device of this invention.
[Drawing 7]It is an explanatory view showing the connect control sequence of the move station in the wireless LAN system of this invention.
[Drawing 8]It is a block diagram showing the outline composition of the conventional wireless LAN system.
[Explanations of letters or numerals]
1 [-- A control section and 31 / -- A storage parts store and 31a / -- The number management table of permission, and 31b / -- A refusal ID management table, 31c / -- Move station management table] -- A move station and 2 -- An access point and 3 -- A control device and 30

[Translation done.]

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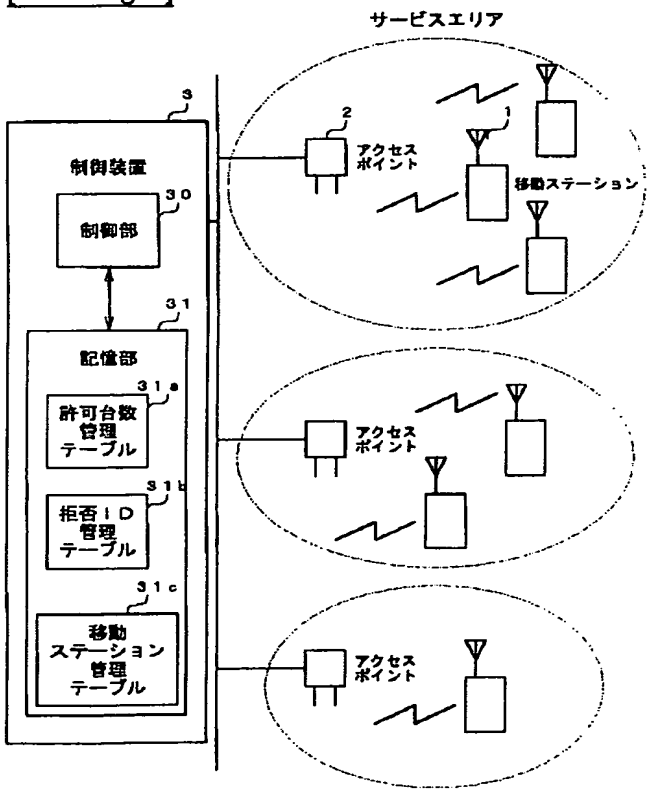
DRAWINGS

[Drawing 1]



[Drawing 2]

許可台数管理テーブル３１ａ

a オフセット	b アクセスポイント番号	c 許可台数	d 接続台数
0	001	64	48
1	002	0	0
2	003	16	10
・	・	・	・
・	・	・	・
・	・	・	・
・	・	・	・
n−1	X64	32	16

[Drawing 3]

拒否ＩＤ管理テーブル３１ｂ

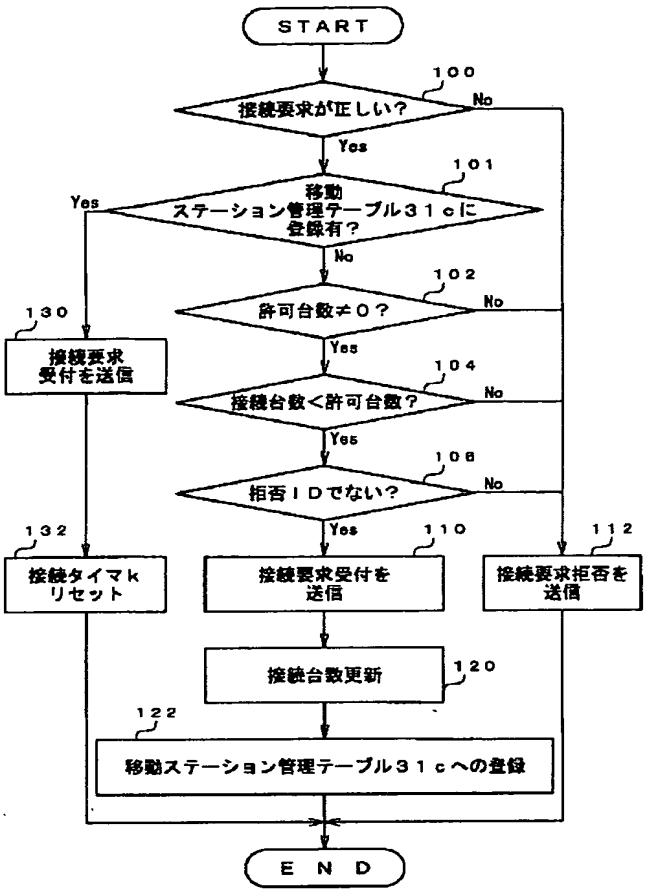
e オフセット	f アクセスポイント番号	g 拒否ＩＤ
0	X16	XXXXX1
1	X16	XXXXX2
2	X16	XXXXX3
・	・	・
・	・	・
・	・	・
・	・	・
N−1	X32	XXXX64

[Drawing 4]

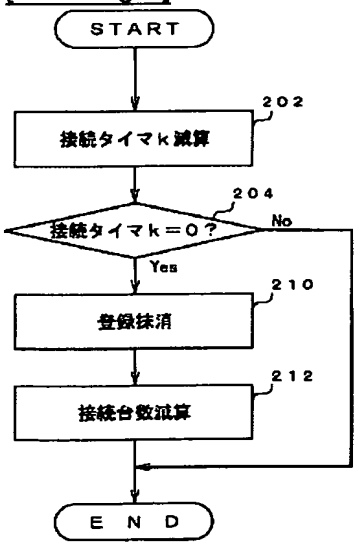
移動ステーション管理テーブル３１ｃ

h オフセット	i アクセスポイント番号	j 移動ステーション識別子	k 接続タイマ
0	××1	××××1	3分
1	××1	××××2	2分30秒
2	××1	××××3	2分
・	・	・	・
・	・	・	・
・	・	・	・
m−1	×32	××××64	m分

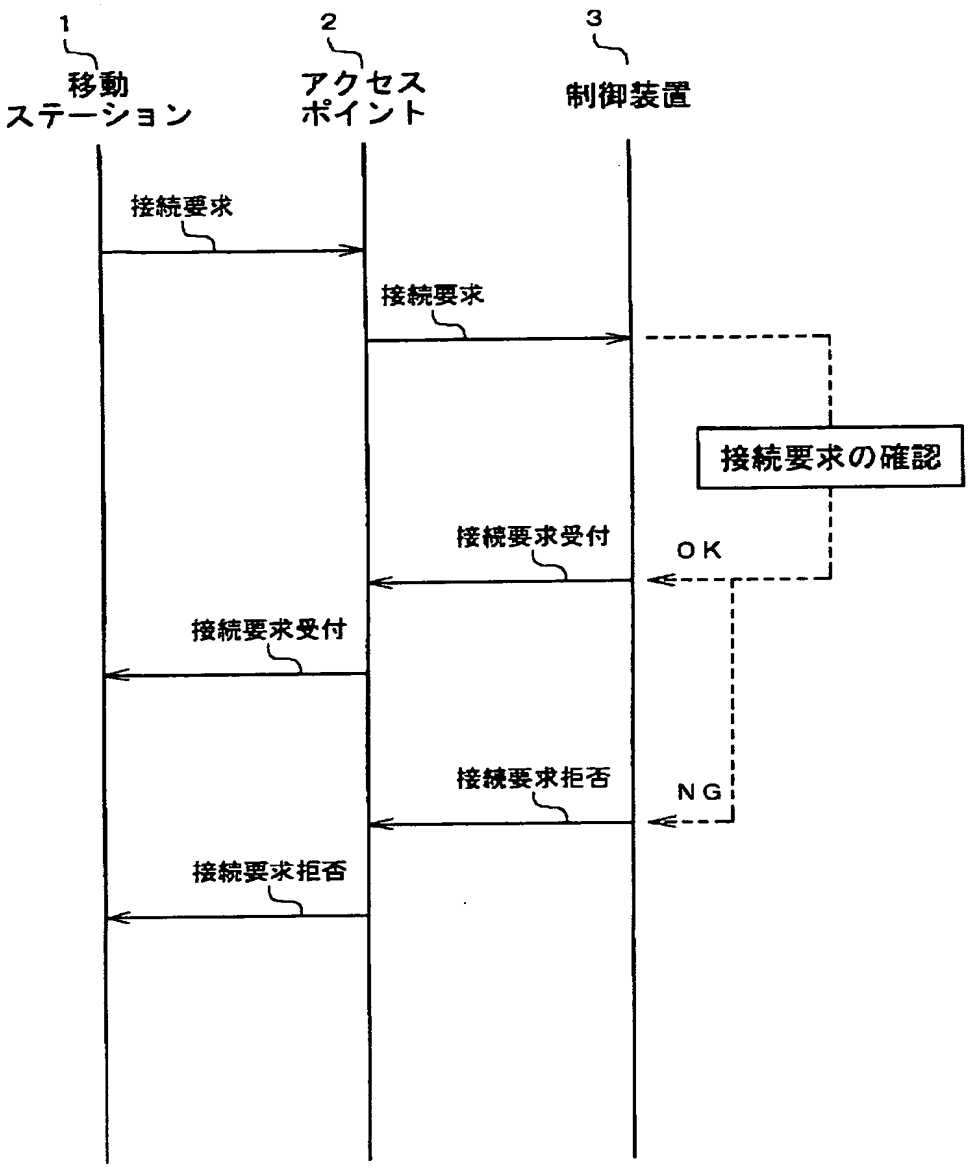
[Drawing 5]



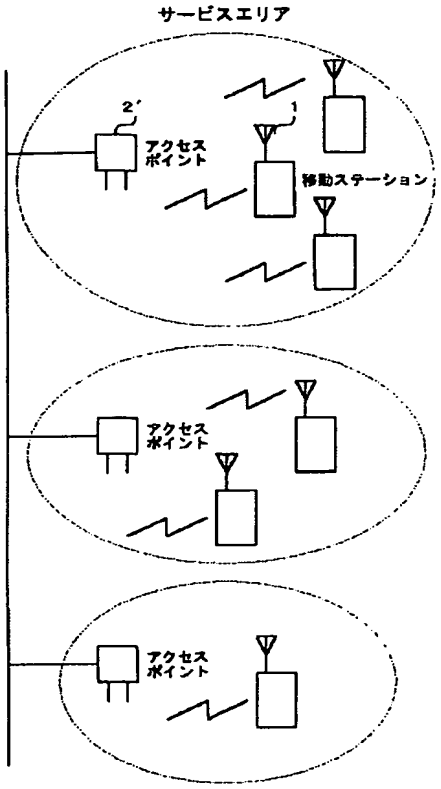
[Drawing 6]



[Drawing 7]


1
移動
ステーション
2
アクセス
ポイント
3
制御装置
接続要求
接続要求
接続要求の確認
接続要求受付
OK
接続要求受付
接続要求拒否
NG
接続要求拒否

[Drawing 8]



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Ｈ０４Ｑ　7/38		Ｈ０４Ｂ　7/26	１０９Ａ
7/22		Ｈ０４Ｑ　7/04	Ａ
7/24			
7/26			

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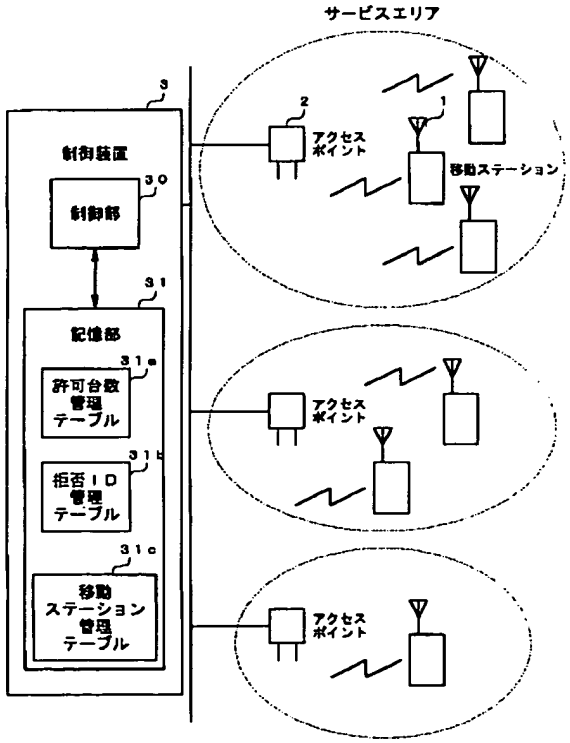
(54)【発明の名称】　無線ＬＡＮシステム

(57)【要約】

【課題】　移動ステーション数が増えると送受信スループットが低下するという問題点を解決し、特定条件下において移動ステーションの接続を制限し、送受信スループットの低下を抑制できる無線ＬＡＮシステムを提供する。

【解決手段】　各アクセスポイント２における移動ステーション１の接続許可条件を制御装置３内に記憶し、移動ステーション１からの接続要求に対して、制御装置３で接続許可条件に適合するか判断し、適合する場合にのみ接続を許可して移動ステーション１が接続される無線ＬＡＮシステムである。



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【特許請求の範囲】

【請求項１】　複数のアクセスポイントを有する無線ＬＡＮシステムにおいて、任意のアクセスポイントが管理するサービスエリア内の移動ステーションから、前記アクセスポイントに対して予め定められた台数を超えて接続要求が為された場合に、前記移動ステーションの接続を制限することを特徴とする無線ＬＡＮシステム。

【請求項２】　複数のアクセスポイントを有する無線ＬＡＮシステムにおいて、任意のアクセスポイントが管理するサービスエリア内の移動ステーションから接続要求が為された場合に、前記アクセスポイントに対して予め定められた移動ステーションの識別子で前記移動ステーションの接続を制限することを特徴とする無線ＬＡＮシステム。

【発明の詳細な説明】

【０００１】

【発明の属する技術分野】本発明は、無線ＬＡＮシステムに係り、特にアクセスポイント毎に移動ステーションの接続を制限できる無線ＬＡＮシステムに関する。

【０００２】

【従来の技術】従来の無線ＬＡＮシステムについて図８を使って説明する。図８は、従来の無線ＬＡＮシステムの概略構成を示すブロック図である。従来の無線ＬＡＮシステムは、図８に示すように、無線伝送路及び有線ＬＡＮを介してお互いにデータ通信を行う移動ステーション１と、サービスエリア内の移動ステーション１との無線通信を行い、更に無線区間と有線ＬＡＮとを接続するブリッジの機能を行うアクセスポイント２′とから構成されていた。

【０００３】従来の無線ＬＡＮシステムにおいて、アクセスポイント２′には１つの無線媒体が割り当てられ、前記無線媒体はサービスエリア内の多くの移動ステーション１で共有される。つまり、アクセスポイント２′に無線媒体として割り当てられた周波数帯域は、データ伝送用のメッセージチャネルと、メッセージチャネル予約の為のリクエストチャネルと、リクエストに対する応答の為の応答チャネルとに分割して使用される。

【０００４】そして、アクセスポイント２′と移動ステーション１との間のアクセス方法は、データ伝送に先立って使用するチャネルを予約する予約方式の無線媒体アクセス制御方式が一般的である。具体的には、移動ステーション１からアクセスポイント２′方向にデータ伝送を要求する場合、移動ステーション１からアクセスポイント２′に対して、リクエストチャネルを用いてメッセージチャネル予約のためのリクエストフレーム（接続要求）を送信する。

【０００５】そして、サービスエリア内に複数存在するであろう移動ステーション１からのリクエストフレームを受信したアクセスポイント２′がスケジューリングを行って、応答チャネルを用いてメッセージチャネル使用

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予約の可否を応答フレームとして移動ステーション１に返送する。

【０００６】そして、この応答フレームを受信した移動ステーション１が、スケジュールされた時刻に、伝送データをメッセージチャネルを用いてアクセスポイント２′に送信するようになっている。

【０００７】

【発明が解決しようとする課題】しかしながら、従来の無線ＬＡＮシステムでは、１つのアクセスポイント２′に接続する移動ステーション１の数が多いほど、１台の移動ステーション１に無線媒体のメッセージチャネルが割り当てられる単位時間当たりの回数が減り、送受信スループットが低下してしまうという問題点があった。

【０００８】さらに、サービスエリア内で接続を要求する移動ステーション１は全て接続可能であることから、無線を伝送媒体としていることに起因するセキュリティ管理が十分でないという問題点があった。

【０００９】本発明は上記実情に鑑みて為されたもので、予め、アクセスポイント毎に設定された許可条件に従って、サービスエリア内での移動ステーションの接続を制御することにより、特定条件下において移動ステーションの接続を制限し、送受信スループットの低下を抑制できる無線ＬＡＮシステムを提供することを目的とする。

【００１０】

【課題を解決するための手段】上記従来例の問題点を解決するための請求項１記載の発明は、無線ＬＡＮシステムにおいて、複数のアクセスポイントを有する無線ＬＡＮシステムにおいて、任意のアクセスポイントが管理するサービスエリア内の移動ステーションから、前記アクセスポイントに対して予め定められた台数を超えて接続要求が為された場合に、前記移動ステーションの接続を制限することを特徴としており、特定のアクセスポイントにおける移動ステーションの接続を接続台数で制限できる。

【００１１】上記従来例の問題点を解決するための請求項２記載の発明は、無線ＬＡＮシステムにおいて、複数のアクセスポイントを有する無線ＬＡＮシステムにおいて、任意のアクセスポイントが管理するサービスエリア内の移動ステーションから接続要求が為された場合に、前記アクセスポイントに対して予め定められた移動ステーションの識別子で前記移動ステーションの接続を制限することを特徴としており、特定のアクセスポイントにおける移動ステーションの接続を移動ステーションの識別子で制限できる。

【００１２】

【発明の実施の形態】請求項に係る発明について、その実施の形態を図面を参照しながら説明する。本発明に係る無線ＬＡＮシステムは、有線ＬＡＮを介して接続されたアクセスポイントにおける移動ステーションの接続許

可制御を行う制御装置を設け、各アクセスポイントにおける移動ステーションの接続許可条件として台数及び移動ステーションの識別子等を制御装置内に記憶し、移動ステーションからの接続要求に対して、制御装置で接続許可条件に適合するか判断し、適合する場合にのみ接続を許可して移動ステーションが接続されるものなので、アクセスポイント毎に特定条件下において移動ステーションの接続を制限できるものである。

【００１３】まず、本発明に係る無線ＬＡＮシステムの構成について図１を使って説明する。図１は、本発明に係る無線ＬＡＮシステムの構成ブロック図である。尚、図８と同様の構成をとる部分については同一の符号を付して説明する。

【００１４】本発明の無線ＬＡＮシステム（本システム）は、従来の無線ＬＡＮシステムと同様の部分として、移動ステーション１と、アクセスポイント２とから構成され、更に本発明の特徴部分として、制御装置３が設けられている。

【００１５】次に、本システムの各部について具体的に説明する。移動ステーション１は、従来と全く同様で、無線ＬＡＮに接続することによって互いに通信する装置である。そして、移動ステーション１が、あるアクセスポイント２の管理するサービスエリア内でその電源がＯＮされた時や、該サービスエリア外から移動してきた場合に、自己の識別子（ＩＤ）を含む接続要求をアクセスポイント２に送信し、アクセスポイント２から接続要求受付を受け取ると、以降通信ができるものである。

【００１６】尚、移動ステーション１は、その内部に識別子（ＩＤ）を記憶し、アクセスポイント２への接続要求にはその識別子を付加するようになっている。移動ステーション１の識別子としては、例えば有線ＬＡＮのインタフェースプロトコルがイーサネット及びＩＥＥＥ８０２.３とした場合、ネットワーク上で一意のアドレスであるＭＡＣアドレスを移動ステーションの識別子として割り当てることが最も有効である。

【００１７】アクセスポイント２は、移動ステーション１との無線送受信を行う装置であると同時に、無線通信の基本サービルエリア（Basic Service Area：ＢＳＡ）とバックボーンＬＡＮ（有線ＬＡＮ）とを接続するブリッジに相当する機能を持つ。つまり、無線区間から受信したデータに有線ＬＡＮ用のヘッダを付加して有線ＬＡＮに送出したり、逆に有線ＬＡＮから受信したデータに無線区間用のヘッダを付加して無線区間に送出したりする。

【００１８】そして、アクセスポイント２は、自己の識別子としてアクセスポイント番号を内部に記憶しており、有線ＬＡＮ用のヘッダ内にアクセスポイント番号を組み込んで送信するようになっている。

【００１９】制御装置３は、有線ＬＡＮを介してアクセスポイント２と接続され、アクセスポイント２における

移動ステーション１の接続許可の制御を行うものである。

【００２０】制御装置３の内部の構成は、図１に示すように、制御部３０と、記憶部３１とから構成され、記憶部３１には、許可台数管理テーブル３１ａと、拒否ＩＤ管理テーブル３１ｂと、移動ステーション管理テーブル３１ｃとが記憶されている。

【００２１】許可台数管理テーブル３１ａは、アクセスポイント２毎に移動ステーション１の接続許可台数と、移動ステーション１の接続状況とを管理するテーブルである。

【００２２】本発明の許可台数管理テーブル３１ａは、図２に示すように、オフセットａと、アクセスポイント番号ｂと、許可台数ｃと、接続台数ｄとから構成されている。図２は、本発明の制御装置３に記憶されている許可台数管理テーブル３１ａのフォーマット例および格納例を示す図である。

【００２３】オフセットａは、該無線ＬＡＮシステムに有線ＬＡＮで接続されているアクセスポイント２の数分の順次番号である。アクセスポイント番号ｂは、アクセスポイント２の識別子であると同時に、ＢＳＡ番号を示す。

【００２４】許可台数ｃは、接続許可条件として、予め設定されたアクセスポイント２における移動ステーション１の接続許可台数を記憶する。なお、許可台数ｃを０に設定した場合、無条件で該アクセスポイント２における移動ステーション１の接続を拒否するものである。接続台数ｄは、アクセスポイント２における現状の接続台数を記憶する。

【００２５】拒否ＩＤ管理テーブル３１ｂは、アクセスポイント２毎に接続を拒否する移動ステーション１の識別子（ＩＤ）を管理するテーブルである。

【００２６】本発明の拒否ＩＤ管理テーブル３１ｂは、図３に示すように、オフセットｅと、アクセスポイント番号ｆと、拒否ＩＤｇとから構成されている。図３は、本発明の制御装置３に記憶されている拒否ＩＤ管理テーブル３１ｂのフォーマット例および格納例を示す図である。

【００２７】オフセットｅは、該無線ＬＡＮシステムに有線ＬＡＮで接続されているアクセスポイント２に対して設定する拒否ＩＤ数分の順次番号である。アクセスポイント番号ｆは、アクセスポイント２の識別子であると同時に、ＢＳＡ番号を示す。拒否ＩＤｇは、接続許可条件として、アクセスポイント２において接続を拒否する移動ステーションの識別子（ＩＤ）である。

【００２８】移動ステーション管理テーブル３１ｃは、図４に示すように、オフセットｈと、アクセスポイント番号ｉと、移動ステーション識別子ｊと、接続タイマｋとから構成されている。図４は、本発明の制御装置３に記憶されている移動ステーション管理テーブル３１ｃの

フォーマット例および格納例を示す図である。

【００２９】オフセットｈは、該無線ＬＡＮシステムに有線ＬＡＮで接続されているアクセスポイント２に対して接続している移動ステーション１の数分の順次番号である。アクセスポイント番号ｉは、アクセスポイント２の識別子であると同時に、ＢＳＡ番号を示す。

【００３０】移動ステーション識別子ｊは、アクセスポイント２において接続している移動ステーション１の識別子（ＩＤ）である。接続タイマｋは、アクセスポイント２に接続中の移動ステーション１の接続状態を管理するタイマで、具体的には、登録抹消までの時間を管理している。

【００３１】そして、実際には、制御装置３が、アクセスポイント２を介して移動ステーション１からの接続要求を新規で受け付けた場合に、アクセスポイント番号ｉ及び移動ステーション識別子ｊが記憶され、接続タイマｋに予め定められた特定時間（登録抹消までの最長時間）を設定し、以降接続タイマｋの時間を順次デクリメントしていく。

【００３２】そして、接続タイマｋの時間が０になると、接続状態でなくなったと判断されて、そのレコードが移動ステーション管理テーブル３１ｃから削除される。また、削除までの間に、再度同一のアクセスポイント番号ｉ及び移動ステーション識別子ｊからの接続要求があると、接続タイマｋに登録抹消までの最長時間がセットされてリセットされるようになっている。

【００３３】制御部３０は、アクセスポイント２における移動ステーション１の接続許可の制御を行うものであり、具体的には、アクセスポイント２を介して受け取った移動ステーション１からの接続要求に対する接続許可の制御を行う接続許可制御処理と、管理下のアクセスポイント２に接続された移動ステーション１の管理を行う移動ステーション管理処理を行う。

【００３４】まず、制御部３０の接続許可制御処理の流れについて、図５を使って説明する。図５は、本発明の制御装置３の制御部３０における接続許可制御処理の流れを示すフローチャート図である。

【００３５】本発明の制御装置３の制御部３０における接続許可制御処理は、アクセスポイント２から接続要求を受け取ると起動され、接続要求が正しいか判断し（１００）、正しい場合（Ｙｅｓ）は、接続要求のあったアクセスポイント番号と移動ステーション識別子の組み合わせが移動ステーション管理テーブル３１ｃに登録されているか判断する（１０１）。

【００３６】そして、登録されていない場合（Ｎｏ）は、許可台数管理テーブル３１ａを参照して、接続要求を送信したアクセスポイント２の番号に対応する許可台数が０でないか判断し（１０２）、０でない場合（Ｙｅｓ）は、アクセスポイント２の番号に対応する接続台数が許可台数より小さいか判断する（１０４）。

【００３７】そして、接続台数が許可台数より小さい場合は（Ｙｅｓ）は、拒否ＩＤ管理テーブル３１ｂを参照して、移動ステーション１のＩＤがアクセスポイント２の番号に対応する拒否ＩＤでないか判断し（１０６）、拒否ＩＤでないなら（Ｙｅｓ）、接続要求受付をアクセスポイント２に送信し（１１０）、許可台数管理テーブル３１ａにおける接続台数に１加算して更新し（１２０）、移動ステーション管理テーブル３１ｃへの登録を行い（１２２）、接続許可制御処理を終了する。

【００３８】ここで、移動ステーション管理テーブル３１ｃへの登録とは、接続要求を送信したアクセスポイント番号ｉと移動ステーション識別子ｊを移動ステーション管理テーブル３１ｃに格納し、更に予め定められている登録抹消までの最長時間を接続タイマｋに設定する処理である。

【００３９】一方、処理１０１において、移動ステーション管理テーブル３１ｃに登録されている場合（Ｙｅｓ）は、接続要求受付をアクセスポイント２に送信し（１３０）、移動ステーション管理テーブル３１ｃの当該移動ステーション識別子の接続タイマｋに登録抹消までの最長時間を設定してリセットし（１３２）、接続許可制御処理を終了する。

【００４０】一方、処理１００において接続要求が正しくない場合（Ｎｏ）、処理１０２において許可台数が０の場合（Ｎｏ）、処理１０４において接続台数が許可台数より小さくない場合（Ｎｏ）、処理１０６において拒否ＩＤである場合（Ｎｏ）は、接続要求拒否をアクセスポイント２に送信し（１１２）、接続許可制御処理を終了する。

【００４１】尚、図５の処理では、接続要求を送信したアクセスポイント番号と移動ステーション識別子の組み合わせが移動ステーション管理テーブル３１ｃに登録されているか判断し、登録されていない場合は、新規として処理１０２に進んだが、任意の移動ステーション識別子が別のアクセスポイントとの組み合わせで登録されているような場合は、当該登録を移動ステーション管理テーブル３１ｃからそのレコードを削除して、許可台数管理テーブル３１ａにおける当該アクセスポイントにおける接続台数を１減算して更新してから、処理１０２に進むようにするとより厳密に接続台数を管理できるものである。

【００４２】また、上記説明では、接続を拒否する移動ステーション１のＩＤを拒否ＩＤ管理テーブル３１ｂに登録して、登録されたＩＤからの接続要求を拒否するように記述したが、逆に接続を許可する移動ステーション１のＩＤを登録して、登録されたＩＤのみ登録を許可するようにしても構わない。

【００４３】次に、制御部３０の移動ステーション管理処理の流れについて、図６を使って説明する。図６は、本発明の制御装置３の制御部３０における移動ステーシ

ョン管理処理の流れを示すフローチャート図である。尚、図６は、移動ステーション管理テーブル３１ｃに登録された１つの移動ステーションに対する処理を示しており、実際には、登録された全ての移動ステーションに対して同様の処理を繰り返すことになる。

【００４４】本発明の制御装置３の制御部３０における移動ステーション管理処理は、予め設定されている接続タイマｋの更新単位時間毎に起動され、移動ステーション管理テーブル３１ｃの接続タイマｋを更新単位時間だけ減算し（２０２）、接続タイマｋの値が０になったか判断し（２０４）、０になっていない場合（Ｎｏ）は、移動ステーション管理処理を終了する。

【００４５】一方、接続タイマｋの値が０になった場合は、移動ステーション管理テーブル３１ｃから登録を抹消し（２１０）、当該移動ステーションのアクセスポイントに関する許可台数管理テーブル３１ａの接続台数ｄを１減算して（２１２）、移動ステーション管理処理を終了する。

【００４６】次に、本発明の無線ＬＡＮシステムの動作について図１，図７を使って説明する。図７は、本発明の無線ＬＡＮシステムにおける移動ステーション１の接続制御シーケンスを示す説明図である。本発明の無線ＬＡＮシステムにおいて、あるアクセスポイント２が管理するＢＳＡ下で移動ステーション１の電源がＯＮされた時や、移動ステーション１が該ＢＳＡ外から移動してきた場合に、自己の識別子（ＩＤ）を含む接続要求をアクセスポイント２に送信する。

【００４７】移動ステーション１からの接続要求を受信したアクセスポイント２は、接続要求に自己のアクセスポイント番号を付加して制御装置３に送信する。

【００４８】そして、アクセスポイント２からの接続要求を受信した制御装置３は、接続許可制御処理として、接続要求の確認処理を行い、接続可能（ＯＫ）であれば接続要求受付を折り返しアクセスポイント２に返信し、接続拒否（ＮＧ）であれば接続要求拒否を折り返しアクセスポイント２に返信する。

【００４９】ここで、接続要求の確認処理としては、接続要求の内容が正しく、接続要求した移動ステーション１とアクセスポイント２との組み合わせが、既に移動ステーション管理テーブル３１ｃに登録されている場合は、単に接続可能と判定する。また、移動ステーション管理テーブル３１ｃに登録されていない場合は、予め設定された許可条件である許可台数と拒否ＩＤとに従って接続の可否を判定し、接続可能であれば、許可台数管理テーブル３１ａの接続台数が１加算されるようになっている。

【００５０】尚、制御装置３では、許可条件の１つである許可台数を管理するために、アクセスポイント２に接続された移動ステーション１の接続状況を管理している。つまり、アクセスポイント２から接続要求がくると、移動ステーション管理テーブル３１ｃにアクセスポイント番号と移動ステーション識別子と、接続タイマとして登録抹消までの最長時間を設定する。

【００５１】そして、更新単位時間毎に接続タイマの値を減算し、０になると登録が抹消され、許可台数管理テーブル３１ａの接続台数も減らされるようになっている。

【００５２】そして、接続要求受付又は接続要求拒否を受け取ったアクセスポイント２は、その接続要求受付又は接続要求拒否を移動ステーション１へ返信するようになっている。

【００５３】本発明の無線ＬＡＮシステムによれば、制御装置３内の記憶部３１に予めアクセスポイント２毎の接続許可台数を記憶し、移動ステーション１からの接続要求をアクセスポイント２経由で制御装置３が受け取ると、当該アクセスポイント２に関して接続台数が接続許可台数の範囲内であるかという許可条件を判断し、許可条件に適合している場合に接続要求受付を移動ステーション１に返送するので、アクセスポイント２毎に接続する移動ステーション１の数を制限でき、移動ステーション１とアクセスポイント２間の送受信スループットの低下を抑制でき、無線ＬＡＮシステム全体におけるトラフィック制御を可能にする効果がある。

【００５４】また、本発明の無線ＬＡＮシステムによれば、制御装置３内の記憶部３１に予めアクセスポイント２毎の拒否ＩＤ又は許可ＩＤを記憶し、移動ステーション１からの接続要求をアクセスポイント２経由で制御装置３が受け取ると、当該アクセスポイント２に関して当該移動ステーション１がアクセスポイント２における拒否ＩＤでないか、又は許可ＩＤであるかという許可条件を判断し、許可条件に適合している場合に接続要求受付を移動ステーション１に返送するので、アクセスポイント２毎に接続する移動ステーション１に対して、不適切な移動ステーション１の接続は排除し、又は適正な移動ステーション１を接続する事によって、特定地域における移動ステーションの適正な接続を実現できる効果がある。

【００５５】さらに、移動ステーション毎に該システムへの接続を管理することにより、無線を伝送媒体としていることに起因するセキュリティに対する不安、例えば、ネットワーク経由にて電気通信回線に接続する場合等の不正端末の進入や誤課金、誤接続等を解消できる効果がある。

【００５６】

【発明の効果】請求項１記載の発明によれば、任意のアクセスポイントに対して予め定められた台数を超えて移動ステーションから接続要求が為された場合に、移動ステーションの接続を制限する無線ＬＡＮシステムとしているので、特定のアクセスポイントにおける移動ステーションの接続を接続台数で制限でき、無線区間における

送受信スループットの低下を抑制できる効果がある。

【００５７】請求項２記載の発明によれば、移動ステーションからアクセスポイントに接続要求が為された場合に、アクセスポイントに対して予め定められた移動ステーションの識別子で移動ステーションの接続を制限する無線ＬＡＮシステムとしているので、特定のアクセスポイントにおける移動ステーションの接続を移動ステーションの識別子で制限でき、特定地域において移動ステーションの適正な接続を実現できる効果がある。

【図面の簡単な説明】

【図１】本発明に係る無線ＬＡＮシステムの構成ブロック図である。

【図２】本発明の制御装置に記憶されている許可台数管理テーブルのフォーマット例および格納例を示す説明図である。

【図３】本発明の制御装置に記憶されている拒否ＩＤ管理テーブルのフォーマット例および格納例を示す説明図＊である。

【図４】本発明の制御装置に記憶されている移動ステーション管理テーブルのフォーマット例および格納例を示す説明図である。

【図５】本発明の制御装置の制御部における接続許可制御処理の流れを示すフローチャート図である。

【図６】本発明の制御装置の制御部における移動ステーション管理処理の流れを示すフローチャート図である。

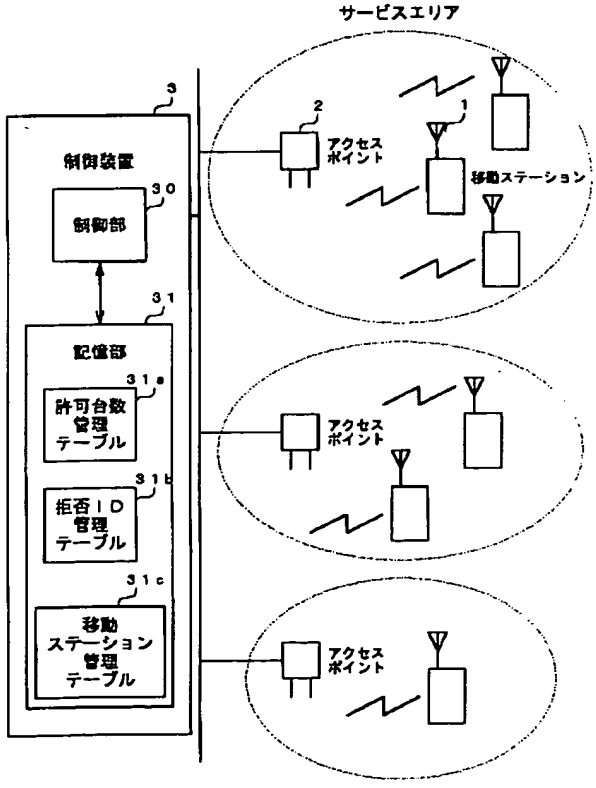
【図７】本発明の無線ＬＡＮシステムにおける移動ステーションの接続制御シーケンスを示す説明図である。

【図８】従来の無線ＬＡＮシステムの概略構成を示すブロック図である。

【符号の説明】

１…移動ステーション、　２…アクセスポイント、　３…制御装置、　３０…制御部、　３１…記憶部、　３１ａ…許可台数管理テーブル、　３１ｂ…拒否ＩＤ管理テーブル、３１ｃ…移動ステーション管理テーブル

【図１】



【図２】

許可台数管理テーブル３１ａ

a オフセット	b アクセスポイント番号	c 許可台数	d 接続台数
0	001	64	48
1	002	0	0
2	003	16	10
・	・	・	・
・	・	・	・
・	・	・	・
n－1	X64	32	16

【図３】

拒否ＩＤ管理テーブル３１ｂ

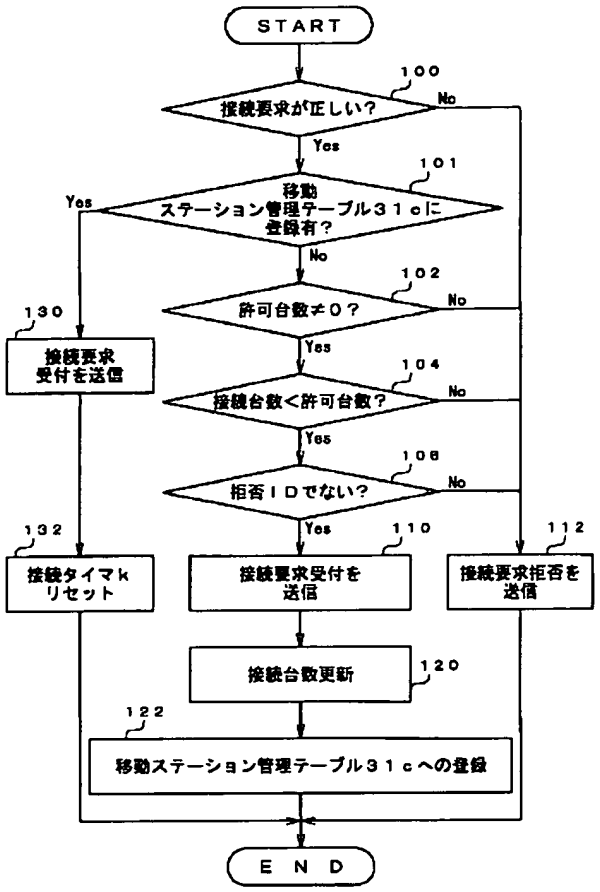
e オフセット	f アクセスポイント番号	g 拒否ＩＤ
0	X16	XXXXX1
1	X16	XXXXX2
2	X16	XXXXX3
・	・	・
・	・	・
・	・	・
N－1	X32	XXXX64

【図４】

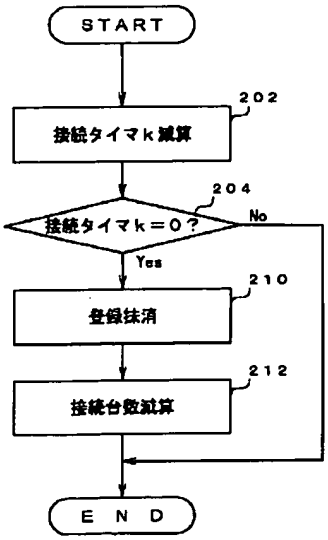
移動ステーション管理テーブル３１ｃ

h オフセット	i アクセス ポイント番号	j 移動ステーション 識別子	k 接続タイマ
0	××1	×××××1	3分
1	××1	×××××2	2分３０秒
2	××1	×××××3	2分
・ ・ ・	・ ・ ・	・ ・ ・	・ ・ ・
m−1	×32	××××64	m分

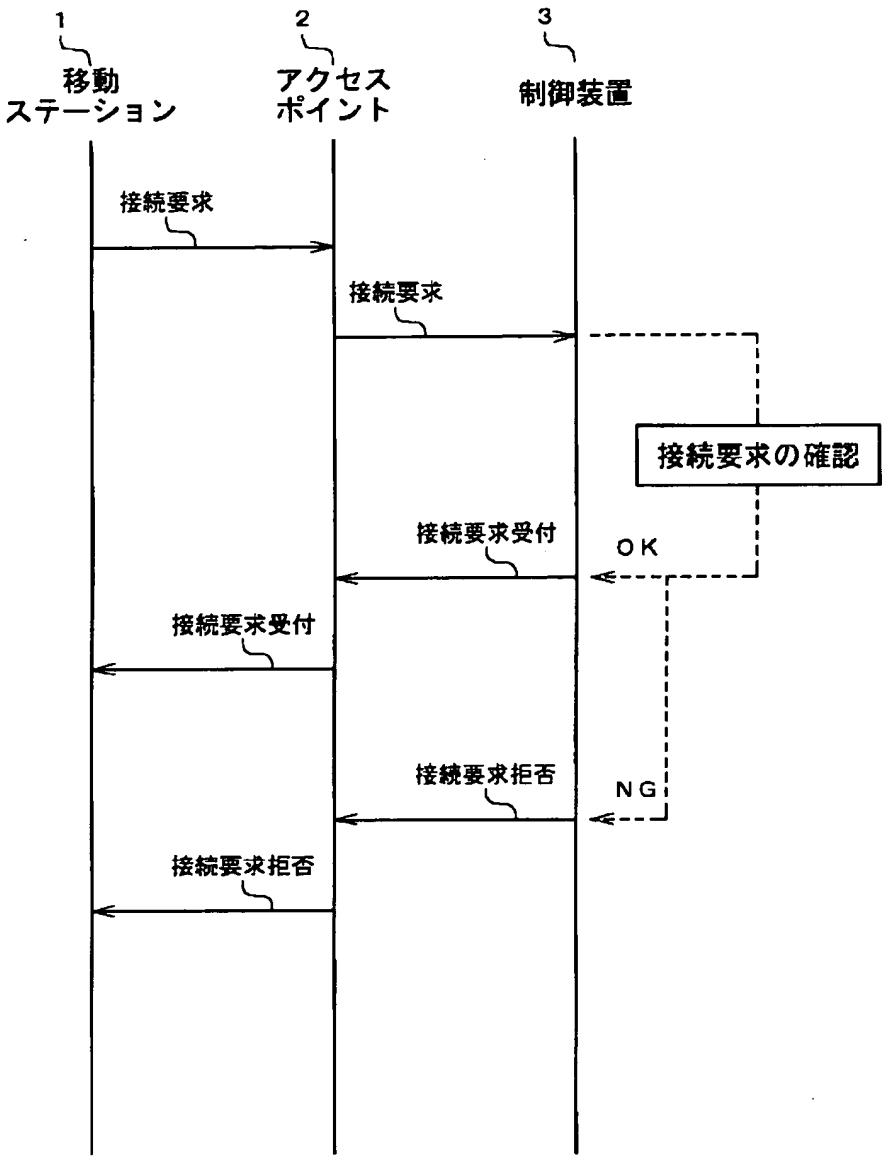
【図５】



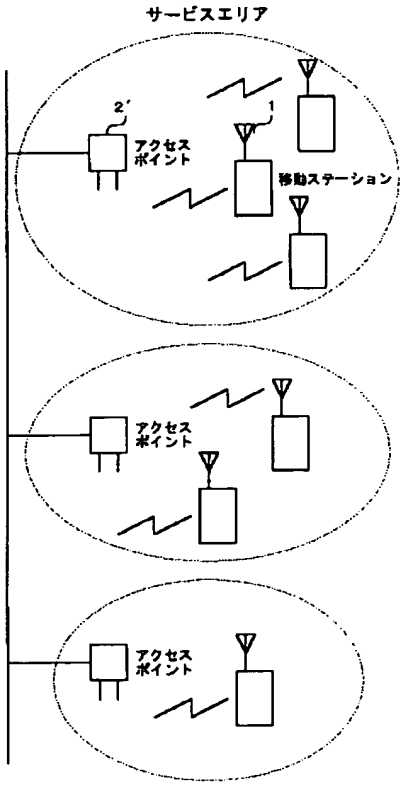
【図６】



【図７】


1
移動
ステーション
2
アクセス
ポイント
3
制御装置
接続要求
接続要求
接続要求の確認
接続要求受付
OK
接続要求受付
接続要求拒否
NG
接続要求拒否

【図８】



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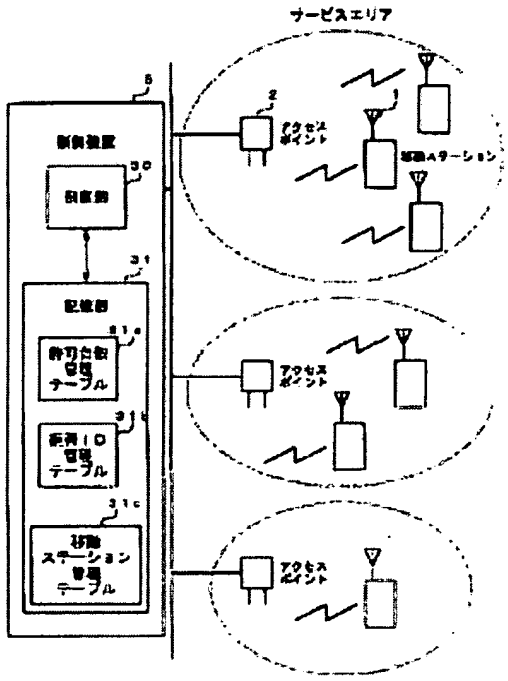
(71)Applicant : KOKUSAI ELECTRIC CO LTD
(72)Inventor : KAMITO TAKEYA

(54) RADIO LAN SYSTEM

(57)Abstract:
PROBLEM TO BE SOLVED: To suppress deterioration of transmission/reception throughput by regulating the connection to a roaming station when a connection request exceeding a previously decided number is made to an access point from the roaming station in a service area managed by an arbitrary access point among plural access points.
SOLUTION: When the power of the roaming station 1 is turned on and it roams from out of the service area, the connection request containing a self-identifier is transmitted to the access point 2. The access point 2 adds an access point number of the connection request and transmits it to a controller 3. The controller 3 stores the number of connection possible stations at every access point 2 in a storage device 31 and executes recognition processing of the connection request. When connection is possible, a connection request reception is returned to the access point 2, and connection request denial when connection is denied. The access point 2 returns it to the roaming station 1.